

Claims

What is claimed is:

1. A vibratory mechanism comprising:
 - a first eccentric weight being rotatably supported within a housing;
 - a second eccentric weight being coaxially rotatable with said first eccentric weight;
 - a inner shaft operatively connected to said first eccentric weight;
 - an outer shaft being coaxially positioned about said inner shaft and operatively connected to said second eccentric weight; and
 - a gearbox operatively connected to said inner shaft and said outer shaft, said gearbox being adapted to index said second eccentric weight relative to said first eccentric weight.
2. The vibratory mechanism in claim 1, including a motor connected to said gearbox to supply rotational input to said first eccentric weight and said second eccentric weight.
3. The vibratory mechanism in claim 1, wherein said gearbox has first and second planetary arrangements.
4. The vibratory mechanism in claim 3 wherein said gearbox includes:
 - an input sun gear coaxial with said inner shaft and driven by said motor;
 - an input planetary gear set that meshes with said input sun gear;
 - a fixed ring gear that meshes with said input planetary gear set;

an output planetary gear set, said input planetary gear set is connected to said output planetary gear set;

a movable ring gear which meshes with said output planetary gear set; and

an output sun gear that meshes with said output planetary gear set and drives said outer shaft.

5. The vibratory mechanism in claim 3, further including a pinion gear operatively connected to a phase control device for rotating said movable ring gear to index said second eccentric weight relative to said first eccentric weight.

6. The vibratory mechanism in claim 5, wherein said phase control device is a phase motor.

7. The vibratory mechanism in claim 5, wherein said phase control device is rack and two opposing linear actuators.

8. The vibratory mechanism in claim 5, wherein said phase control device is a hand wheel.

9. The vibratory mechanism recited in claim 1, further including a speed sensor mounted on said inner shaft and another speed sensor mounted on said outer shaft.

10. The vibratory mechanism recited in claim 9, further including: a motor connected to said gearbox for rotating said inner and said outer shafts;

a speed sensor connected with each of said inner shaft and said outer shaft;

a sensor connected with a phase control device; and

a controller that uses an output of said speed sensors and said sensor to control operation of said vibrator propel motor and said phase control device.

11. A work machine, comprising:

a compacting drum supporting said work machine;

a vibratory mechanism coaxially positioned within said compacting drum;

said vibratory mechanism including;

a first eccentric weight being rotatably supported within a housing;

a second eccentric weight being coaxially rotatable with said first eccentric weight;

an inner shaft operatively connected to said first eccentric weight;

an outer shaft being coaxially positioned about said inner shaft and operatively connected to said second eccentric weight; and

a gearbox operatively connected to said inner shaft and said outer shaft, said gearbox being adapted to index said second eccentric weight relative to said first eccentric weight.

12. The work machine in claim 11, including:

a first power source;

a propel motor connected to said compacting drum and operatively connected with said first power source;

a second power source;

a motor connected to the gearbox to rotate said first and said second eccentric weights, said motor being operatively connected to said second power source.

13. The work machine in claim 12, wherein said first and second power sources are hydraulic pumps.

14. The work machine in claim 12, wherein said first and second power sources are electric generators.

15. The work machine in claim 12 wherein said gearbox includes:
an input sun gear coaxial with by said inner shaft and driven by said motor;

an input planetary gear set that meshes with said input sun gear;

a fixed ring gear that meshes with said input planetary gear set;

an output planetary gear set, said input planetary gear set is connected to said output planetary gear set;

a movable ring gear which meshes with said output planetary gear set; and

an output sun gear that meshes with said output planetary gear set and drives said outer shaft in rotation.

16. The work machine in claim 12, further including:

a pinion gear; and

a phase control device operatively connected to said pinion gear for rotating said movable ring gear to index said second eccentric weight relative to said first eccentric weight.

17. The work machine in claim 12, wherein said phase control device is a phase motor.

18. The work machine in claim 12, wherein said phase control device is a rack and two opposing linear actuators.

19. The work machine in claim 11, further including a speed sensor connected with said inner shaft and another speed sensor connected with said outer shaft.

20. The work machine recited in claim 11, further including a pinion gear operatively connected to a phase motor for rotating said movable ring gear to index said second eccentric weight relative to said first eccentric weight, and an output shaft of said phase motor having a rotary sensor attached therewith.

21. The work machine recited in claim 11, further including:
a motor for rotating said through shaft;
a speed sensor connected with each of said inner shaft and said outer shaft;
a phase position sensor connected with each of said inner shaft and said outer shaft; and
a controller that uses an output of a one of said speed sensors and said phase position sensors to control operation of said motor and said phase control device.

22. The work machine recited in claim 21, further including an accelerometer for outputting signals indicative of an amount of vibration created by rotation of said first and second eccentric weights, wherein said controller

controls operation of said motor and said phase control device based on the output signals of said accelerometer.

23. A method for operating a vibratory mechanism of a work machine having a gearbox for adjusting a vibration amplitude, the gearbox includes an inner shaft connected with a first eccentric weight and an outer shaft, surrounding at least portion of the inner shaft, is connected with a second eccentric weight, said method comprising:

operating the gearbox to change a phase difference between the first eccentric weight and the second eccentric weight to change the vibration amplitude.

24. The method recited in claim 23, wherein said operating step is performed manually.

25. The method recited in claim 23, wherein said operating step is performed automatically.

26. The method recited in claim 23, wherein said operating step is controlled by a computer controller based on at least one of a ground speed of the vibratory compactor, a rotation speed of one or both of the inner shaft and the outer shaft, and an amount of vibration.